Molecular Epidemiology and Antimicrobial Susceptibility of Extended-Spectrum β-lactamases Produced by Clinical Isolates of Escherichia Coli Collected from ICU Patients in Shiraz, Iran

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Background & Objectives: Extended-spectrum β-lactamase (ESBL) producing gram negative bacilli are a growing concern in human medicine today. When producing these enzymes, organisms (mostly *E.coli* and *K.pneumoniae*) become highly efficient at inactivating the newer third-generation cephalosporins. The aim of this study was to understand the molecular epidemiology of *E.coli* ESBL producers and to identify the ESBL genes carried by them.

Methods: In this descriptive cross-sectional study, 195 clinical isolates of *E.coli* collected from ICUs was tested. Invitro susceptibility testing, screening for ESBL production and minimum inhibitory concentration (MIC) was carried by the disk diffusion methods according to the CLSI (Clinical & Laboratory Standard Institute) guideline. All isolates were screened for the resistance genes TEM, CTX-M and SHV by a Multiplex PCR assay using universal primers. Data were analysed using ANOVA, chi-squre or Fisher exact tests. For all tests, $p<0.05$ was considered significant.

Results: The occurrence of ESBL-producing strains in the studied population of patients was 60.51% based on initial screening using the double disk synergy test. The MIC of resistant isolates against cephotaxime using the E.test strips was determined: 23.86. The prevalence of ESBL-producing strains by PCR assay was 60.51% The presence of the ESBL genes was confirmed by DNA sequence analysis.

Conclusion: These studies are essential for clinicians need to be aware of resistance rates observed in clinical isolates. Different prescription policies may influence the rates and patterns of resistance.

Keywords: ESBLs; *Escherichia coli*; Multiplex PCR; ICU